ACHIEVER TEST SERIES / JOINT PACKAGE COURSE

TARGET : PRE-MEDICAL 2025

Test Type : **UNIT TEST # 02** Test Pattern : **NEET (UG)**

TEST DATE : 27-10-2024

ANSWER KEY

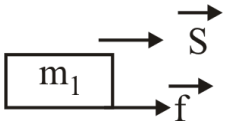
Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A.	2	1	1	4	1	3	2	3	2	3	4	1	4	2	4	1	1	2	1	2	1	1	3	4	3	2	4	2	1	2
Q.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A.	4	2	2	4	3	1	3	4	1	1	2	3	2	1	1	2	3	4	3	2	2	2	3	4	2	2	1	3	4	1
Q.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
A.	4	2	1	1	2	1	1	1	1	1	1	4	2	3	3	2	2	2	3	2	1	1	2	3	4	1	4	3	3	2
Q.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
A.	2	3	3	4	4	2	2	4	3	3	2	4	3	1	2	3	1	2	2	2	1	4	4	1	2	1	1	3	2	1
Q.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
A.	4	2	3	2	1	2	1	3	1	1	3	1	1	4	2	2	2	3	1	3	1	3	1	4	2	1	1	4	3	1
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
A.	4	2	2	4	3	1	4	1	3	3	2	2	1	3	3	1	3	1	4	2	1	1	3	2	3	1	3	2	3	1
Q.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200										
A.	3	2	1	3	1	3	3	3	3	3	2	2	2	1	3	4	4	2	1	1										

HINT – SHEET

SUBJECT : PHYSICS

SECTION - A

1. Ans (2)



2. Ans (1)

$$W = \int_0^2 x\,dx + \int_1^1 y\,dx + \int_1^1 z\,dz = 2J$$

3. Ans (1)

$W_f = \Delta$ k.E

$-(4\text{ mg})\,30 = \frac{1}{2}m\left(10^2 - 20^2\right)$

$\mu = \frac{1}{2} = 0.5$

4. Ans (4)

at, D & B, $\frac{dU}{dx} = 0$

i.e. F = 0, equilibrium position

at D, $\frac{d^2U}{dx^2} = -ve$ unstable equilibrium

at C, $\frac{dU}{dx}$ is maximum

5. Ans (1)

$W = Mgh_{cm} = (\rho V)g\,h_{cm} = 10^3 \times (1)^3 \times 10 \times \frac{1}{2}$

$= 5000J$

6. Ans (3)

Elongation $x = \frac{3\pi r}{2} - \frac{\pi r}{2} = \pi r$

Energy stored $= \frac{1}{2}kx^2 = \frac{1}{2}k(\pi r)^2$

$= \frac{1}{2}k\pi^2 r^2$

7. **Ans (2)**

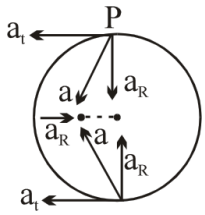
$$\text{Power} = FV = \left(V\frac{dm}{dt}\right)V$$

$$= \left(\frac{dm}{d\ell}\right)\left(\frac{d\ell}{dt}\right)V^2 = \left(\frac{dm}{d\ell}\right)V^3$$

$$= (50)(4)^3 = 3200\ W$$

8. **Ans (3)**

$\vec{a} = \vec{a}_t + \vec{a}_R$



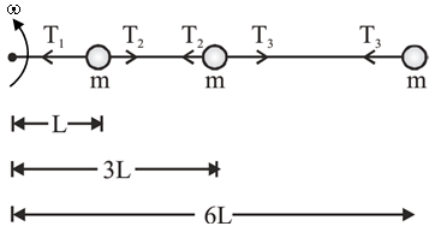
9. **Ans (2)**

$$a_c = \frac{v^2}{R} = \frac{(30)^2}{R} = \frac{900}{150} = 6\ cms^{-2}$$

$a_t = 8\ cm\ s^{-2}$

$$a = \sqrt{a_c^2 + a_t^2} = \sqrt{(6) + 8^2} = 10\ cm\ s^{-2}$$

10. **Ans (3)**



ω will be same for three particles

$T_1 - T_2 = m\omega^2 L$ (i)

$T_2 - T_3 = m\omega^2(3L)$ (ii)

$T_3 = m\omega^2(6L)$ (iii)

$T_3 = 6\ m\omega^2\ L$, $T_2 = 9\ m\omega^2 L$, $T_1 = 10\ m\omega^2 L$

$T_3 : T_2 : T_1 = 6 : 9 : 10$

11. **Ans (4)**

$$\omega = 2\pi\left(\frac{2}{\pi}\right) = 4 rad/s$$

$T\sin\theta = M(L\sin\theta)\omega^2$

$T = 16\ ML$

12. **Ans (1)**

$v \leqslant \sqrt{\mu_s Rg}$

$$R = \frac{v^2}{\mu_s g} = \frac{(5)^2}{0.25 \times 10} = 10\ m$$

13. **Ans (4)**

At heighest position speed just becomes zero by energy conservation

$$\frac{1}{2}mv^2 = mg(2R - h)$$

$$V = \sqrt{2g(2R - h)}$$

14. **Ans (2)**

Tension at lowest point

$= T_{max}$

$$T_{max} - mg = \frac{m(8kg)}{R}$$

$T_{max} = 9mg$

$T_{min} = 9mg - 6mg = 3mg$

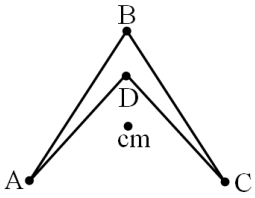
$$\frac{T_{min}}{T_{max}} = \frac{1}{3}$$

15. **Ans (4)**

At mean position $a_t = 0$ $a_c \neq 0$

At extream position $a_c = 0$ $a_t \neq 0$

17. **Ans (1)**



system like this statement I true and II false.

18. **Ans (2)**

Option (C) ⇒ Momentum can't be destroyed by internal forces

Option (B) ⇒ If mass of stationary body is infinite then moving body rebounds.

19. **Ans (1)**

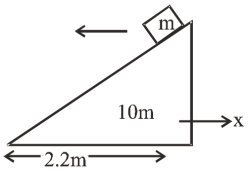
$$x = \frac{A_1x_1 - A_2x_2}{A_1 \times A_2} = \frac{\pi(2R)^2 \times 0 - \pi R^2(R)}{\pi(2R)^2 - \pi R^2}$$

$$x = -\frac{R}{3},\ \text{distance } \alpha R = \frac{R}{3}$$

20. **Ans (2)**

$$x_{cm} = \frac{\int_0^L \left(\frac{kx^3}{L^2}\right)x\,dx}{\int_0^L \frac{kx^3}{L^2}\,dx} = \frac{4L}{5}$$

21. **Ans (1)**

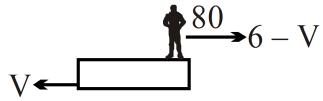


$10m[+x] - m[2.2 - x] = 0$

$11mx = m \times 2.2$

$\boxed{x = 0.2m}$

22. Ans (1)



$80(6 - V) - 40\ V = 0$

$V = 4$ m/s

Velocity towards shore $= 6 - V = 6 - 4 = 2$m/s

23. Ans (3)

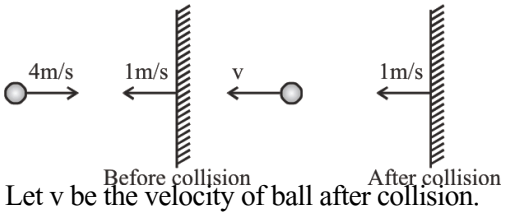
At maximum compression both the particles have same velocity.

$\vec{P}_i = \vec{P}_f$

$10 \times 5 - 20 \times 2 = 30 \times v$

$v = \frac{1}{3}$ m/sec

24. Ans (4)



Let v be the velocity of ball after collision.

Collision is elastic.

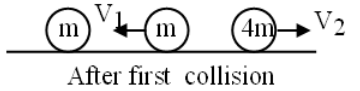
$\therefore \quad e = 1$

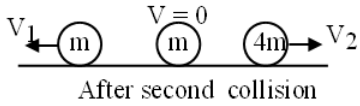
or relative velocity of separation=relative velocity of approach

$\therefore \quad v - 1 = 4 + 1$

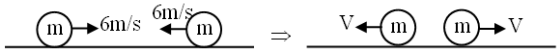
or $\quad v = 6$ m/s (away from the wall)

25. Ans (3)





26. Ans (2)



$e = \frac{2V}{12} = \frac{1}{3} \Rightarrow v = 2$m/s

27. Ans (4)

When axis passes through CM, MOI will be minimum.

Therefore $\frac{dI}{dx} = 0$

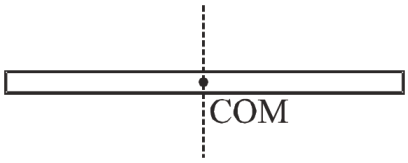
$\Rightarrow 4x - 12 = 0$

$\Rightarrow x = 3$

OR

$\frac{dI}{dx} = 4x - 12 = 0 \Rightarrow x = 3$

28. Ans (2)

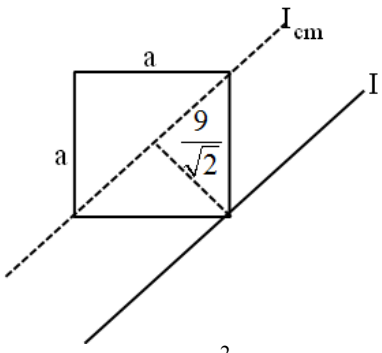


Total mass = 4 M

Total Length = 4L

$I = \frac{4M(4L)^2}{12} = \frac{16ML^2}{3}$

29. Ans (1)



$I = I_{cm} + m\left(\frac{9}{\sqrt{2}}\right)^2$

$I = \frac{ma^2}{12} + \frac{ma^2}{2} = \frac{7ma^2}{12}$

30. Ans (2)

Moment of 4 N force

$= 4 \times \frac{20}{100}$ N-m (anti-clockwise)

Moment of 8 N force

$= 8 \times \frac{20}{100} \times \sin 30°$ N-m (clockwise)

Moment of 9 N force

$= 9 \times \frac{20}{100}$ N-m (clockwise)

Moment of 6 N force $= 6 \times \frac{20}{100} \times \sin 0° = 0$

$\therefore \tau = \left(4 \times 0.2 - 8 \times 0.2 \times \frac{1}{2} - 9 \times 0.2\right)$

$= -1.8$N-m

$= 1.8$ N-m(clockwise)

31. Ans (4)

By conservation of angular momentum

$mv_1 r = mv_2(r/2) \Rightarrow v_2 = 2v_1$

$KE = \frac{1}{2} mv_2^2 = \frac{1}{2} m(2v_1)^2 = 4\left(\frac{1}{2} mv_1^2\right)$

32. Ans (2)

$I_1 w_1 = I_2 w_2$

$r \to \frac{r}{n} \Rightarrow I \to \frac{I}{n^2}$

$w_2 = n^2 w_1$

$T \propto \frac{1}{w} \Rightarrow T^1 \to \frac{T}{n^2}$

34. Ans (4)

$(K.E)_R = 40\%\ (K.E)_T$

$\frac{1}{2}mv^2\left(\frac{K^2}{R^2}\right) = \frac{40}{100}\left(\frac{1}{2}mv^2\right)$

$\frac{K^2}{R^2} = \frac{2}{5}$ = solid ball

35. Ans (3)

We know that $\frac{t_{sliding}}{t_{rolling}} = \frac{1}{\sqrt{1+\frac{k^2}{R^2}}} = \frac{1}{\sqrt{2}}$

So for Ring $\frac{K^2}{R^2} = 1$

SECTION - B

36. Ans (1)

$a \propto -x$

$a = -kx$

$\int_u^v v\,dv = -k\int_0^x x\,dx$

$\frac{v^2}{2} - \frac{u^2}{2} = \frac{-kx^2}{2}$

$\frac{mu^2}{2} - \frac{-mv^2}{2} = \frac{mkx^2}{2}$

$(-\Delta KE) = \left(\frac{mk}{2}\right)x^2$

$(-\Delta KE) \propto x^2$

37. Ans (3)

For conservative force

$\frac{\partial F_y}{\partial x} = \frac{\partial F_x}{\partial y}$

38. Ans (4)

$W_F + W_f + W_g = \Delta K.E$

$W_F - mgh - (\mu\, mg\cos\theta)\, AB = 0 - 0$

$W_F = mgh + \mu\, mg\,(AB\cos\theta)$

$W_F = mgh + \mu\, mg\ell$

$W_F = mg\,(h + \mu\ell)$

39. Ans (1)

$N = m\ell\omega^2$

$\mu N \geqslant mg$

$\mu\left(m\ell\omega^2\right) \geqslant mg$

$\omega^2 \geqslant \frac{g}{\mu\ell}$

$\omega_{min} = \sqrt{\frac{g}{\mu\ell}}$

40. Ans (1)

$N_B - N_A = \frac{2mV^2}{R} = 400$

$v^2 = \frac{400\times 2}{2\times 100} = 4 \Rightarrow v = 2m/s$

41. Ans (2)

As velocity of centre of mass is zero so

$V_{C_x} = \frac{m\times 3 - 3\times\frac{1}{2}\times 2 - 1\times\frac{1}{2}\times 6}{4+m} = 0$

$\Rightarrow m = 2kg$

42. Ans (3)

$mv = (M+m)\,v'$

$v' = \frac{mv}{(M+m)} = \sqrt{2gh}$

$v = \sqrt{29h}\left(\frac{M+m}{m}\right)$

43. Ans (2)

by momentum conservation law

$mv = (2m+m)v_1$

$v_1 = \frac{v}{3}$

loss in KE $= \frac{1}{2}mv^2 - \frac{1}{2}(2m+m)\left(\frac{v}{3}\right)^2$

$= \frac{1}{2}mv^2 - \frac{1}{2}\frac{mv^2}{3}$

$= \frac{2}{3}\left(\frac{1}{2}mv^2\right)$

%loss in KE $= \frac{\Delta KE}{KE_1}\times 100$

$= 2/3\times 100 = \frac{200}{3}\%$

44. Ans (1)

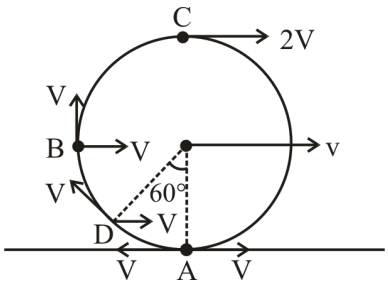
Along y-axis : $v_2 \sin\theta = \frac{1}{2}v_1\cos 60°$ ....(i)

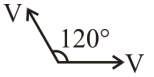
Along x-axis : $v_2\cos\theta = v_1\sin 60°$ ....(ii)

eq (i) , eq (ii) $\tan\theta = \frac{1}{2\sqrt{3}}$

45. Ans (1)

$\omega = \dfrac{V}{R}$



at D $\Rightarrow$ 

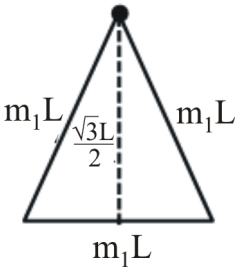
$V_D = 2V\cos\left(\dfrac{120}{2}\right)$

$V_D = V$

46. Ans (2)

$I = \left(\dfrac{ML^2}{3}\right) + \left(\dfrac{ML^2}{3}\right) + \left(\dfrac{ML^2}{12} + M\left(\dfrac{\sqrt{3}}{2}L\right)^2\right)$

$I = \dfrac{3}{2}ML^2$



47. Ans (3)

$mg - T = ma$ ... (1)

$T\ell - mg\dfrac{\ell}{2} = \dfrac{m\ell^2\alpha}{3} = \dfrac{m\ell^2}{3}\dfrac{a}{\ell}$ ...(2)

solving (1) & (2) $\Rightarrow$ $a = \dfrac{3g}{8}$

48. Ans (4)

Let length be L

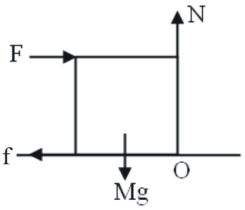
by $F = ma$ we have $F_1 = 3N$

Now $\tau_{COM} = 0$

$\Rightarrow \dfrac{3L}{2} = 5\left(\dfrac{L}{2} - 20\right)$

L = 100 cm

49. Ans (3)



Not sliding

$F \leqslant \mu mg$

$F = \mu mg$ ...(1)

(For toppling) $F \times \ell > mg \times \dfrac{\ell}{2}$

$F > \dfrac{mg}{2}$ ... (2)

$\mu mg > \dfrac{mg}{2}$

$\mu > \dfrac{1}{2}$

50. Ans (2)

Energy conservation $mg\dfrac{L}{2} = \dfrac{1}{2}I\omega^2$

$\dfrac{mgL}{2} = \dfrac{1}{2}\left(\dfrac{mL^2}{3}\right)\omega^2$

$\omega = \sqrt{\dfrac{3g}{L}}$

$V = L\omega = \sqrt{3gL}$

SUBJECT : CHEMISTRY

SECTION - A

54. Ans (4)

Unit of $k = \left[\dfrac{mol}{lit.}\right]^{1-n} time^{-1}$

(A) for zero order = mol L^{-1} s^{-1}

(B) for second order = mol^{-1} L s^{-1}

(C) for $3/2^{th}$ order = $mol^{-1/2}$ $L^{1/2}$ s^{-1}

(D) for 1^{st} order = s^{-1}

57. Ans (1)

$\because [A]_0 - [A]_t = kt$

$[A]_t = -kt + [A]_0$

$y = mx + c$

60. Ans (1)

$r \propto [C]^1$ [For first order reaction]

$\dfrac{r_1}{r_2} = \dfrac{C_1}{C_2} = \dfrac{3 \times 10^{-4}}{2 \times 10^{-4}} = \dfrac{3}{2}$

$k = \dfrac{2.303}{75 - 25}\log\dfrac{C_1}{C_2}$

$k = 0.008290\ min^{-1}$

$t_{1/2} = \dfrac{0.693}{k} = \dfrac{0.693}{0.008290}$

$= 83.33$ min

70. Ans (1)

Amount of glucose required = ?

$$n_{glucose} = M \times V_{(L)} = \frac{1}{20} \times \frac{250}{1000} = \frac{1}{80} \text{ mol}$$

$$\omega = \frac{1}{80} \times 180 \text{ g}$$

$= 2.25$ g

73. Ans (2)

5m NaOH solution = 5 mol NaOH in 1kg water.

$$\therefore M = 5 \times \frac{1}{2L}$$

$$\left[\because \text{ Volume } = \frac{1200}{0.6} = 2000 \text{ mL}\right]$$

$= 2.5$ M

74. Ans (3)

Volume strength of H_2O_2 = N × 5.6

= 1.5 × 5.6

Volume strength of $H_2O_2 = 8.4$

75. Ans (3)

$$\frac{n_B}{n_O} = \frac{3}{2}$$

$n_B = 3$, $n_O = 2$

$$n_{Total} = 3 + 2 = 5$$

$$X_B = \frac{n_B}{n_T} = \frac{3}{5}$$

$$X_O = \frac{n_O}{n_T} = \frac{2}{5}$$

$$P_s = P_B^0 x_B + P_O^0 x_O$$

$$P_S = 280 \times \frac{3}{5} + 420 \times \frac{2}{5}$$

$= 336$ mm of Hg

78. Ans (2)

$$\frac{P^0 - P_s}{P_s} = \frac{\text{Moles of solute}}{\text{Moles of solvent}}$$

$$\frac{750 - 740}{740} = \frac{2/M}{156/78}$$

$M = 74$

80. Ans (2)

$\pi = iCRT$

($i = 2$ for NaCl)

$$\pi = \left(\frac{2 \times 0.585 \times 1000}{58.5 \times 100}\right) RT = 4.92 \text{ atm}$$

82. Ans (1)

$x_3y_2\ (aq) \longrightarrow 3x^{+2}\ (aq) + 2y^{-3}(aq)$

$i = 1 - \alpha + n\alpha$

$\Delta T_b = i \times K_b \times m$

$= 2 \times 0.52 \times 2$

$= 2.08$ K

$T_b = 373 + 2.08 = 375.08$ K

SECTION - B

89. Ans (3)

	$(CH_3)_2N_2 \longrightarrow$	C_2H_6	+ N_2
t = 0	200 mm	0	0
t = 40 min	200 − P'	P'	P'

and 200 + P' = 350 ∴ P' = 150 mm

$$k = \frac{2.303}{t} \log \frac{P_0}{P_0 - P'}$$

$$\therefore k = \frac{2.303}{40 \times 60} \log \frac{200}{50}$$

$$= \frac{2 \times 0.693}{2400} = 5.77 \times 10^{-4} \text{ sec}^{-1}$$

90. Ans (2)

$$\log\left(\frac{K_2}{K_1}\right) = \frac{E_a}{2.303\,R}\left(\frac{T_2 - T_1}{T_1\,T_2}\right)$$

$$\log 4 = \frac{E_a}{2.303 \times 8.314}\left(\frac{20}{300 \times 320}\right)$$

$$E_a = \frac{0.6020 \times 2.303 \times 8.314 \times 300 \times 320}{20}$$

$= 55327$ J mol^{-1}

$= 55.3$ kJ mol^{-1}

91. Ans (2)

$k = Ae^{-Ea/RT}$

$$\frac{k}{A} = e^{-Ea/RT} = e^{\frac{-2.303\ RT}{RT}} = e^{-2.303}$$

$$\ell n\left(\frac{k}{A}\right) = -2.303 \qquad (\because \ell ne = 1)$$

$$\Rightarrow 2.303.\log\frac{k}{A} = -2.303$$

$$\log\frac{k}{A} = -1 \Rightarrow \frac{k}{A} = 0.1$$

98. Ans (4)

$$\Delta T_f = \frac{1000 K_f w}{mW} \times i$$

$$i = \frac{\Delta T_f . m . W}{1000 K_f w}$$

$$i = \frac{1.62 \times 122 \times 100}{1000 \times 4.9 \times 8} = 0.504$$

$$\alpha = \frac{i - 1}{\frac{1}{n} - 1} = \frac{0.504 - 1}{0.5 - 1} = 0.992$$

So, % α = 99.2 %

SUBJECT : BOTANY

SECTION - A

101. Ans (2)
NCERT (XII) Pg # 76-78

106. Ans (3)
NCERT XII, Pg. # 88

107. Ans (1)
NCERT Pg. # 152

108. Ans (2)
NCERT (XI^{th}) Pg. # 145

109. Ans (2)
NCERT Fig. # 5.9, Pg. # 92

110. Ans (2)
NCERT (XII) Pg. # 111 para 2.3

112. Ans (4)
NCERT-XII Pg. # 112, 114

117. Ans (1)
NCERT (XIIth) Pg. # 101

127. Ans (1)
NCERT-XII Pg. # 74

128. Ans (3)
NCERT-XII Pg. # 78, 85

129. Ans (1)
NCERT-XII Pg. # 89, 90

SECTION - B

136. Ans (2)
NCERT XII Pg.# 83

137. Ans (2)
NCERT Pg. # 54, 56

138. Ans (3)
NCERT XII Pg. # 63

140. Ans (3)
NCERT XII Pg. # 70,71

141. Ans (1)
NCERT-Pg # 54, 55

142. Ans (3)
NCERT-XII, Pg. # 73

143. Ans (1)
NCERT-XII, Pg. # 70

146. Ans (1)
NCERT XII Pg. # 83

147. Ans (1)
NCERT Pg # 72

148. Ans (4)
NCERT (XIIth) Pg. # 75

149. Ans (3)
NCERT (XII) Pg. # 72-73

SUBJECT : ZOOLOGY

SECTION - A

151. Ans (4)
NCERT-XII, Pg. # 166

152. Ans (2)
NCERT, Pg # 165,173,182,183(E), 181,190,196,197(H)

153. Ans (2)
NCERT, Pg # 168,173,180,185(E)/184,189,192,202(H)

154. Ans (4)
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155. Ans (3)
NCERT XII Pg. # 199

156. Ans (1)
NCERT Pg.# 198

157. Ans (4)
NCERT-XII, Pg. # 195

158. Ans (1)
NCERT Pg.# 201

159. Ans (3)
NCERT, Pg. # 202 (Fig. 11.6)

160. Ans (3)
NCERT, Pg. # 196

161. Ans (2)
NCERT, Pg. # 196

162. Ans (2)
NCERT Pg. No. # 187

163. Ans (1)
NCERT Pg. No. # 187

164. Ans (3)
NCERT-XII, Pg. # 183

165. Ans (3)
NCERT Pg. No. # 188(E)/205(H)

166. Ans (1)
NCERT XIIth Page-183

167. Ans (3)
NCERT Pg. # 181, 183

168. Ans (1)
NCERT, Pg. #

170. Ans (2)
NCERT-XII, Pg. # 177

171. Ans (1)
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172. Ans (1)
NCERT XII, Pg # 177, Para - 9.4

173. Ans (3)
NCERT Pg. # 177

175. Ans (3)
NCERT-XII, Pg. # 182

176. Ans (1)
NCERT, Pg # 184(E)/201(H)

177. Ans (3)
NCERT, Pg # 179,180(E)/196,197(H)

178. Ans (2)
NCERT Pg.# 181

179. Ans (3)
NCERT, Pg. # 183 & 184

180. Ans (1)
NCERT-XII, Pg. # 180

181. Ans (3)
NCERT XII Pg. # 213, 214

182. Ans (2)
NCERT PG: 209, 12.1, Para-2

183. Ans (1)
NCERT Pg # 208

184. Ans (3)
NCERT Pg # 209

185. Ans (1)
NCERT Pg # 179,181,182

SECTION - B

186. Ans (3)
NCERT XII Pg. # 163

187. Ans (3)
NCERT XII Pg # 182, 183

188. Ans (3)
NCERT Pg.# 200

189. Ans (3)
NCERT, Pg.# 202

190. Ans (3)
NCERT-XII, Pg. # 153

191. Ans (2)
NCERT, Pg. # (E)-154, (H)-169,170

192. Ans (2)
NCERT Pg. # 185

193. Ans (2)
NCERT Pg.177

194. Ans (1)
NCERT XII Pg. No. # 193

195. Ans (3)
NCERT Pg # 177

196. Ans (4)
NCERT-XII, Pg. # 179

197. Ans (4)
NCERT, Pg. # 185

198. Ans (2)
NCERT, Pg. # 185

199. Ans (1)
[NCERT PG: 211, Para-1]

200. Ans (1)
NCERT Pg # 210, 214